17202

15116

2 Hours / 50 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any NINE of the following : **18**

a) Define uniform acceleration and state its SI unit.

b) State the work-energy principle.

c) If a body of mass 160 kg changes its velocity from 18 m/s to 9 m/s, Calculate the impulse acting on a body.

d) Define projectile motion. Give two examples of projectile motion.

e) State any two properties of ultrasonic waves.

f) Define neutral temperature and inversion temperature.

g) Define thermo emf. State factors on which thermo emf is dependent.

h) State any two properties of photon.

i) Draw circuit diagram for the experiment to study photoelectric effect.

j) State two properties of X-rays.

k) A X-ray tube works on 40 kV. What will be the wavelength of X-rays emitted by it ?

l) Explain population inversion.

P.T.O.

Marks

2. Attempt any FOUR of the following : **16**

a) A bullet of mass 30 gm leaves the barrel of a gun with muzzle velocity of 800 m/s. If the length of the barrel is 1 m, Find the impulse and the impulsive force.

b) State the three equations of motion when a body is moving vertically upwards against the gravity along with meanings of symbols.

c) A bullet is fired with a velocity of 350 m/s in the direction making an angle of 35° with the horizontal, calculate :

(i) Maximum height reached.

(ii) Range

d) Explain the production of ultrasonic waves using piezoelectric method.

e) State the criteria for selection of NDT method.

f) Describe LPT with its

(i) Principle

(ii) Experimental procedure.

3. Attempt an FOUR of the following : **16**

a) A train crosses a tunnel in 25 seconds. At the entry of the tunnel its velocity is 36 km/hr and at the exit of the tunnel, the velocity is 72 km/hr. Find the length of the tunnel.

b) Compare Peltier effect and Joule's effect.

c) Explain use of thermocouple to measure temperature.

d) If a light of wavelength 3000 A° is incident on a metal surface of work-fuction 5 ev, will the electrons be ejected or not ? Given $h = 6.63 \times 10^{-34}$ JS, $C = 3 \times 10^{8}$ m/s.

e) State engineering and scientific applications of X-rays.

f) State four properties of LASER light.

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